(meth)acrylate monomer, at least one unsaturated ether monomer, at least one radical photoinitiator (referring to page 15, lines 1-39, page 16, lines 10-40) and at least one coloring agent referring to page 6, lines 15-39 and further asserts that the reference discloses an ink having a viscosity of less than 50 mPas at the 25°C mark referring to page 4, lines 30-35.

The Examiner further characterizes this reference as disclosing an ink-jet ink which is suitable for printing on a porous substrate and refers to the examples. The Examiner states that the ink of the reference includes by weight included 2 to 15 parts of a monofunctional (meth)acrylate monomer in an amount to about 2 to 15 parts referring to the example. The Examiner also asserts that the monofunctional (meth)acrylate monomer may be selected from esters of acrylic acids, for example, octylacrylate, decylacrylate, isobornyl acrylate, etc. referring to page 15, lines 1-39 and page 16, lines 10-40 and at the monofunctional (meth)acrylate monomers present in an amount of 50-95% by weight and preferably from 60-80% by weight again referring to the examples. The Examiner additionally asserts that the photoinitiator may be a free radical initiator and lists a number of free radical initiators assertedly shown in the examples. The Examiner further characterizes the reference as disclosing a dispersible pigment as a coloring agent in an amount of from between 0.5-15% by weight and a method for ink-jet printing wherein the method uses the ink-jet ink as claimed onto porous substrates and finally the Examiner states that the Laksin, et al. reference discloses all of the limitation of the presently claimed ink composition except for the addition of the unsaturated ether monomer.

The Examine then relies on the Mantell, et al. EP '346 reference as teaching the addition of ethylene glycol monovinylether monomer to confer satisfactory properties to an ink composition even without adding water pointing to column 4, lines 41-51.

The Examiner concludes that it would have been obvious to one or ordinary skill in the art at the time of the invention to employ ethylene glycol monovinylether as disclosed in Mantell, et al. as the monomer containing a single terminal ethylenic group in the composition of Laksin, et al. to obtain an ink composition having a low viscosity. The Examiner further states that Laksin, et al. provides motivation by teaching that a monomer having a single terminal ethylene group can be combined with a multifunctional acrylate monomer to achieve a low viscosity and that Mantell, et al. provides motivation by teaching that the addition of ethylene glycol monovinylether monomer confers satisfactory properties to an ink composition.

The Examiner finally states that one of ordinary skill in the art at the time the invention was made would have been motivated by reasonable expectation of a success of providing an ink-jet composition free of water and having low viscosity for ink-jet printing as taught by Mantell, et al.

However, it is submitted that this combination of references does not support the Examiner's assertions. Thus, it should be noted that the crux of the present invention lies in the inventor's realization that the combination of at least one α, β-unsaturated ether monomer, and at least one monofunctional (meth)acrylate monomer provides an ink with a very low viscosity that can be used for printing onto porous substrates, such as paper and board. The combination of these two types of monomers means that it is not necessary to include a volatile organic solvent in the ink in order to lower the viscosity. Furthermore, the inventor realized or discovered that an acceptable cure speed and adhesion to porous material can be achieved even in the absence of multifunctional (meth)acrylates when this combination of monomers is used. Thus, the admission of the monofunctional (meth)acrylate in the inks of the invention as claimed provides advantages in achieving a very low viscosity product.

While the monomers used in the inks of the present invention were known prior to the presently claimed invention, it was not known that a specific combination of monomers as recited in the present claims could be used to achieve these advantageous effects.

The Examiner's assertions are based on combinations of documents that disclose individual ingredients of the inks claimed in the present invention, but certainly do not provide the motivation for their combination to achieve the specific results exhibited by the recited composition.

Moreover, the Examiner has found no prior art document that suggests that the specific combination of a monofunctional (meth)acrylate monomer and at least one α, β-unsaturated ether monomer in an ink which is substantially free of water, volatile solvents and multifunctional (meth)acrylates provides an ink with these advantageous properties.

The Examiner provides at pages 3 and 4 of the Office Action seven features that he suggests are disclosed in Laksin, et al. The features recited are actually taken from the present application and appear to bear no relation to the subject matter of the Laksin reference. For example, the Examiner asserts that Laksin, et al. discloses an ink-jet ink which is essentially free of monofunctional (meth)acrylate and comprises at least one unsaturated ether monomer. In contrast, lines 25-30 of page 15 of Laksin, et al. suggest that a multifunctional acrylic monomer should be used in the inks disclosed therein in order to achieve the desired ink viscosity and cross-linking properties. This is contrary to the assertion of the Examiner.

The Examiner's suggestion that the examples of Laksin, et al. disclose an ink comprising 2-15 parts of monofunctional (meth)acrylate monomer is a mischaracterization since none of the examples of Laksin, et al. comprise (meth)acrylate monomer.

At item 2 on page 4, the Examiner appears to have copied the final paragraph of page 3 of the present application in stating that these monomers disclosed in the examples of Laksin, et al. However, the examples of Laksin, et al. do not disclose a (meth)acrylate monomer and the list of monomers provided at lines 10-24 on page 15 of Laksin, et al. make absolutely no mention of the monomers listed by the Examiner.

Finally, in item 3 on page 4 of the Office Action, the Examiner appears to have copied the list of initiators from paragraph 2 on page 5 of the present application and states that these are disclosed in the examples of Laksin, et al. However, all of the examples of Laksin, et al. use a cationic initiator, not the free radical initiators disclosed in the present application. The only discussion of free radical initiators in Laksin, et al. is provided in lines 12-23 and there is no mention of the free radical initiators disclosed in the present application.

While Laksin, et al. does disclose an ink-jet ink comprising a pigment, a rheological additive and an energy curable liquid vehicle when the ink is substantially free of fugitive solvent, the inks of Laksin, et al. as disclosed therein may be free radical polmerizable systems but cationic polymerizable systems are clearly preferred (see lines 32-35 on page 13). Suitable monomers for free radical polymerizable systems are discussed at line 35 on page 14 to line 30 on page 15. Of these specific monomers listed in lines 10-24 on page 15, only one is monofunctional and this monofunctional monomer is not a (meth)acrylate monomer, i.e., (N-vinyl pyrrolidinone).

All of the remaining monomers disclosed in this reference are monofunctional. Consequently, the reference contains no suggestion that a monofunctional (meth)acrylate monomer should be combined with α, β-unsaturated ether monomer in a free radical polymerizing system. In addition, lines 25 to 30 of page 15 suggest that the use of a

multifunctional acrylic monomer is necessary in order to achieve an ink having the desired properties. This document does not disclose a free radical polymerizable ink-jet ink which is substantially free of multifunctional (meth)acrylate.

Additionally, the Mantell, et al. reference discloses ink-jet ink compositions comprising a colorant and at least one compound selected from epoxy and vinyl ethers. These compositions of Mantell, et al. do not comprise (meth)acrylate monomers. The preferred compositions comprise a co-solvent and/or water (see lines 28 to 40 of column 4 of the Mantell, et al. reference). Since Laksin, et al. discloses solvent-free systems comprising (meth)acrylate monomers and Mantell, et al. discloses (meth)acrylate-free inks comprising a solvent and/or water, one skilled in this art would have had no reason to combine the disclosures of these documents contrary to the assertions of the Examiner. Moreover, even if one skilled in the art were to do so, they would not have been led to the present invention.

In order to get to the inks recited in the present claims from the combination of Laksin and Mantell, one skilled in the art would need to ignore the specific teachings to use a multifunctional acrylate monomer in the Laksin, et al. composition, and instead use a combination of a monofunctional (meth)acrylate monomer and an α, β-unsaturated ether monomer. Since neither document suggests using a monofunctional (meth)acrylate monomer in an ink-jet ink, it is simply inconceivable that one skilled in the art would do this. Moreover, thee is simply no recognition that the use of a monofunctional (meth)acrylate with an α, β-unsaturated ether monomer would provide an ink having the advantageous properties exhibited by the presently claimed ink.

It appears that from the Examiner's comments in the second paragraph of page 5 of the Office Action that the Examiner is of the opinion that the advantages of the inks of the present

invention are also achieved by the inks of Laksin, et al. However, Laksin, et al. provides no examples of a radical polymerization system and no examples of an ink-jet ink comprising (meth)acrylate monomers. Thus, there is simply no evidence in Laksin, et al. to suggest that a low viscosity radical polymerization (meth)acrylate ink can be achieved. Furthermore, Laksin, et al. specifically teaches that the presence of a rheological additive is necessary to achieve an acceptable viscosity whereas the present invention provides an ink-jet ink that has a very low viscosity without the use of a rheological modifier. In other words, the combination of the monofunctional (meth)acrylate monomer and an α, β-unsaturated ether monomer means that that the use of an additional rheological modifier can be avoided. The present claims are clearly patentable over the combination of these references and the attempted combination of these references is improper. This rejection in untenable and should be withdrawn.

In view of the foregoing, it is submitted that this application is in condition for allowance and favorable reconsideration and indication thereof are earnestly requested.

Dated: April 25, 2008

Respectfully submitted,

Jules E. Goldberg – Reg. No. 24,408
Attorney for Applicant
DUANE MORRIS LLP
1540 Broadway
New York, New York 10036
212-692-1000